

NISQUALLY RIVER SUSPENSION BRIDGE
(Longmire Suspension Bridge)
Mount Rainier National Park
Spanning Nisqually River on Service Road
Longmire VIC.
Pierce County
Washington

HAER No. WA-44

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

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HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
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I. INTRODUCTION

Location: Spanning Nisqually River on park service road, Longmire Historic District, Mount Rainier National Park, Pierce and Lewis counties, Washington.
Quad: Wahpenayo Peak, Wash.
UTM: 10/591150/5177800

Date of Construction: 1923-24; reconstructed 1951-52

Structure type: Single-span steel cable suspension bridge with wooden stiffening truss supported by timber towers

FHWA Structure No.: 9450-OD2P

Designer: National Park Service, Engineering Division, Portland, Oregon

Contractor: Monson-Trierweiler Co., Inc., Portland, Oregon
(original span)
Thomas M. Mock, Tacoma, Washington (reconstruction)

Owner: Mount Rainier National Park, National Park Service

Use: Service road bridge

Significance: The oldest surviving road bridge in Mount Rainier National Park, the Nisqually River Suspension Bridge is one of the few road-bearing suspension bridges in the National Park system. Although shorn of its original log elements, the timber bridge continues to reflect the NPS "rustic style" through its use of native material in an attempt to harmonize with the rugged park landscape.

Project Information: Documentation of the Nisqually River Suspension Bridge is part of the Mount Rainier National Park Roads and Bridges Recording Project, conducted in summer 1992 by the Historic American Engineering Record.

Richard H. Quin, HAER Historian, 1992

II. HISTORY

This is one in a series of reports prepared for the Mount Rainier National Park Roads and Bridges Recording Project. HAER No. WA-35, MOUNT RAINIER NATIONAL PARK ROADS AND BRIDGES, contains an overview history of the park roads.

Nisqually River Suspension Bridge

When James Longmire established his development at Longmire Springs in 1883, no provision was made for crossing the Nisqually River. In 1911, park superintendent Edward S. Hall recommended the construction of a suspension bridge at the site in order to provide better access to the park from Rainier National Forest to the southwest. Hall explained the need for the bridge in a 15 June letter to Secretary of the Interior Richard A. Ballinger:

I wish to recommend the construction of a suspension bridge over the Nisqually River at a short distance from Longmire Springs at a point indicated on the present park map. The bridge is required for making accessible during the season of high water, which includes the summer and fall months, the southeast portion of the park and that portion of the Rainier National Forest which lies immediately beyond the southern boundary of the park. It will also make a crossing to connect with the Eagle Peak Trail, constructed last season, which is not now accessible owing to the fact that the temporary bridge constructed last season was washed out during high water last fall, and will make connections with a short trail, not shown on the map, which runs from a point on the south bank of the river opposite the [National Park] Inn and connects with the Cowlitz Trail.¹

Superintendent Hall entered into negotiations with U.S. Forest Service district engineer W.E. Herring, who agreed to seek an allotment from Forest Service funds for construction of the bridge, the cost of which was estimated at \$749. The matter was brought before the Secretary of Agriculture (who had ultimate authority over the Forest Service), and the Secretary agreed to allot \$400 as the Forest Service's share of the project. The Department of the Interior then authorized another \$400 from the Mount Rainier National Park budget as matching funds for the construction of the bridge. Superintendent Hall reported on 28 October that the bridge had been completed, and stated it was "well constructed and satisfactory in every particular." This first structure was a light and narrow suspension span designed for pedestrian use and was called the "Pony Bridge."²

A proposal for a new and more substantial suspension bridge was made in the early 1920s, when superintendent O. A. Tomlinson determined to locate a new campground on the south bank of the river. A new bridge would provide access for the users. Accordingly, Tomlinson requested an appropriation for the bridge as part of the campground development authorization. Funding was authorized under the 1924 fiscal year appropriations act for the Department of the Interior and passed 24 January 1923. The appropriation was granted in connection with the establishment of the new "Longmire Public Auto Camp."³

Proposals for the work were circulated through newspapers and direct solicitation; however, only one bid was received, from the Monson-Trierweiler Co., Inc., a Portland, Oregon concern. The company submitted an incorrect bond, but was given the opportunity to resubmit, and was subsequently awarded the project. The contract was approved on 18 August 1923; the estimate for the costs of construction was \$14,242.⁴

Monson-Trierweiler began excavating for cable anchorages on 20 October. Due to the lateness of the season, not much work was accomplished that year. The contractor was forced to abandon operations in early January 1924 on account of weather conditions, and had not been able to complete pouring concrete for the footings for the supporting towers. The two anchor blocks and part of the west abutment were completed, however, and the reinforcing steel and half of the logs had arrived at the site.⁵

The company resumed work on the bridge in April 1924. By the end of May, the four towers had been erected and the cross bars for supporting the cables were put in place. The bridge was completed in the early summer. Superintendent Tomlinson reported at the end of June that the construction was nearly complete, adding "The bridge with its rustic towers supporting the cable suspension is a very fitting type of construction for a national park." The bridge was accepted by the Park Service on 1 July.⁶

Thaxter Reed of Portland, Oregon, was brought before the U.S. Commissioner in September 1924 and charged with defacing the bridge. He was convicted and fined \$10.00 for the offense. Unfortunately, the superintendent's monthly report does not indicate exactly what Reed did to the bridge.⁷

The approach road to the new campground was completed in May 1925. The campground was finished in July, but because of high fire hazards from all the brush left over from clearing the site, it was not opened to the public until August.⁸

When the Longmire water system was upgraded in the summer of 1932, a wood-stave water pipe was run across the river next to the bridge and suspended by a single cable from the bridge towers.⁹ This was the only significant alteration to the original bridge.

The "rustic style" log structure was reconstructed to bear heavier loads in 1951 and 1952 during the terms of park superintendents John C. Preston and Preston P. Macy. This work was evidently necessitated due to heavier vehicles and increasing use, as well as strengthening bridge safety standards. Invitations to bid on the reconstruction project were issued 30 August 1951,¹⁰ and the \$33,375 contract for the reconstruction of the bridge was awarded on 18 September to Thomas M. Mock of Tacoma.¹¹ The demolition component of the contract included disassembly of the log towers, the floor system, and the wood stiffening truss; these were subsequently burned. Hardware was sorted and saved. A temporary support was installed under the pipe line crossing the bridge so as not to interrupt service. Reconstruction work involved the procurement and fabrication of new lumber, timbers and necessary hardware, erection of towers, replacement of the deck and stiffening truss, rehangng the cables and hanger rods, and the reconnection of the wind guy cables. Metal parts were then painted and the timber stained. The bridge specifications indicate that the only parts from the original bridge which were recycled were the cables, cable shoes and hanger rods.¹²

The original log members were replaced with dimensional lumber. The work involved the replacement of the original towers of whole logs, installation of new 10" x 18" Douglas fir floor beams, and new fir decking. George W. Morgand of the Western Regional Office Planning and Construction Division was architect for the project; Max L. Wallace was Landscape Architect, and H. L. Crowley was Engineer. Plans for the reconstruction were drawn by E. P. Crouch. Crouch was scheduled to serve as resident engineer for the project, but was called into military service (the Korean War being in progress), and could not be spared. The regional office was unable to supply a replacement, so Park Engineer Adolph C. Thuring was assigned to review the work.¹³

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The plans were modified in February 1952 to provide for a 10" board railing across the center of the Howe stiffening truss. This was suggested to prevent the possibility of a child falling through the gap in the truss. This resulted in an extra charge of roughly \$325.00.¹⁴

Although the reconstruction changed the appearance of the bridge, its original form has been retained. The major alteration, other than the substitution of dimensional lumber for the original logs, was the replacement of the original Town lattice stiffening truss with a new modified Howe truss. The work was completed in the spring of 1952 and was accepted by the National Park Service on 9 May. The bridge apparently had been completed some time earlier, as the park employee newsletter noted that Carmen Suazo's baby carriage in February was the first "vehicle" to cross the reconstructed span.¹⁵

A major glacial flood on 31 October 1955 caused the Nisqually River to rise to within two feet of the bottom of the suspension bridge. The NPS Regional Planning and Controls Officer noted that if a large tree with limbs up had washed down, it would have jammed against the bridge, damming the stream and resulting in the destruction of the structure. Indeed, he observed that the entire Longmire area was likely subject to destructive flooding, and recommended that a study be made of relocating the entire administrative complex.¹⁶ Following the flood, some channelization and revetment work was done in the area to reduce the threat from future flooding.

The wood-stave water supply pipe was replaced with a cast-iron pipe in 1962. This pipe utilized the original (1932) pipe hangers and suspension system.¹⁷

A bridge safety inspection conducted by the Federal Highway Administration in 1977 found the bridge in fairly good condition but recommended a number of repairs. The report noted that stringer "D" on span 15 was split for the full length and should be replaced. It also suggested that the circular washers bearing on the wood were too small and the accompanying plate washers too thin for the load. The inspectors recommended that the washers be replaced and all bolted connections tightened. Some rot and checking in minor members was detected but was not considered a significant threat. The FHWA inspector gave the bridge an estimated five-year life, but recommended annual inspections.¹⁸

The Longmire Campground is now closed, but the suspension bridge continues to provide access to the Longmire Community Building and a limited-access service road to the Skate Creek Road (Forest Service Road 52). Despite replacement of the log members with dimensional lumber, the bridge continues to reflect the National Park Service's so-called "rustic style" of architecture through its use of native materials. The structure is listed on the National Register of Historic Places as part of the Longmire Historic District. A new (1992) historical marker at the southwest corner of the bridge provides a brief account of the structure's significance.

Description

The structure is a single-span suspension bridge, with a single-lane modified Howe-type stiffening truss supported by steel cables from timber frame towers of Douglas fir on rock-filled concrete footings. The two 2½" steel wire cables are suspended from metal shoes atop the towers and anchored beyond to native bedrock on the east side and a concrete deadman on the west. Steel rod suspenders, attached by metal crimps to the cables, support the timber deck beams by steel stirrups. The deck is strengthened by a Howe-type stiffening truss (minus the usual vertical metal reinforcing rods but braced by horizontal boards across the center). The 15' deck rests on twenty suspended floor beams on 9' centers, and is not attached directly to the suspension system. The roadway is planked with 3" x 12" boards nailed to the stringers with 6d spikes and is not covered with any wearing surface. Wooden knee braces, 4" x 4" in dimension and extending from the ends of the floor beams, provide additional support. The wooden plank truss elements are joined by bolted splices by anchor bolts attached through malleable iron washers.

Four trapezoidal timber towers (originally constructed of whole logs) support the suspension cables. These towers are 30' in height and spaced 25' apart (measured from center to center of the cast iron saddles for the cables). The towers are attached to the reinforced concrete footings by fixed cast bearing plates. The main posts are 12" square members, stiffened by four sets of 3" x 12" cross braces. At each end, the tops of the towers are joined by wooden trusses, on top of which are set psired heavy beams bearing the cast saddles for the cables. The cables are attached to the anchor plates with "Roebbling Standard Bridge Sockets."

Some split timbers and checking are evident, but the bridge appears in overall good condition. Four steel wind guys, anchored to deadmen on the banks, have been installed to keep the bridge from swaying during major windstorms. The bridge also carries a sewerage pipe supported by a separate suspension cable; other utilities are directly attached to the bridge. The bridge remains in use, providing access to the 1927 Longmire Community Building and the connecting limited-access road to the Gifford Pinchot National Forest.

III. ENDNOTES

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3. Arno B. Cammerer, Acting Director, National Park Service, Washington, to E. C. Finney, First Assistant Secretary of the Interior, Washington, 17 August 1923. National Archives, RG 79 Entry 26, Box 1991, File 12/7, Contracts.
4. *Ibid.*; E. C. Finney, note at bottom of *Ibid.*; Monson-Trierweiler, Inc., Proposal for Nisqually River Suspension Bridge, Mt. Rainier National Park, August 1925. National Archives, RG 79 Entry 25 Box 1, Construction Contracts file.
5. O. A. Tomlinson, Superintendent, Mount Rainier National Park, Superintendent's Monthly Report, October 1923, 3; Superintendent's Monthly Report, December 1923, 4. MORA Archives, Box H2615, Superintendents' Monthly Reports 1920-1923 file.
6. *Idem*, Superintendent's Monthly Report, April 1924, 4; Superintendent's Monthly Report, May 1924, 4; Superintendent's Monthly Report, June 1924, 5; Superintendent's Monthly Report, July 1924, 4. MORA Archives, Box H2615, Superintendents' Monthly Reports 1924-1927 file.
7. *Idem*, Superintendent's Monthly Report, September 1924, 5. MORA Archives, Box H2615, Superintendents' Monthly Reports 1924-1927 file.
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13. Sanford Hill, Assistant Director, National Park Service Region IV, to Macy, 29 January 1952. MORA Archives, Longmire Suspension Bridge contract file.

14. Preston P. Macy, Superintendent, Mount Rainier National Park, to Lawrence Merriam, Director, National Park Service Region IV, 8 February 1952. MORA Archives, Longmire Suspension Bridge contract file.

15. United States Department of the Interior, National Park Service, Planning and Construction Division, Western Regional Office, "Nisqually River Bridge Repairs, Longmire, Mount Rainier National Park," Construction drawings, eight sheets, 3 August 1951. Copy in Engineering Division files, Mount Rainier National Park; Fitzsimons, 2; Macy to Mock, 9 May 1952. MORA Archives, Longmire Suspension Bridge contract file; Coon Holler (Park employee newsletter), 29 December 1952. MORA Library, Coon Holler files.

16. George F. Whitworth, Regional Plans and Control Officer, to Merriam, 7 November 1955. Mount Rainier National Park archives, Box D-30.

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18. United States Department of Transportation, Federal Highway Administration Region B, Office of Western Bridge Design, *Bridge Safety Inspection Report, Nisqually River Suspension Bridge (Longmire), Mt. Rainier N.P.* (Denver, CO: Federal Highway Administration, 9 November 1977), 1, 9-11, 15.

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- Superintendent's Monthly Report, June 1924. MORA Archives, Box H2615, Superintendents' Monthly Reports 1924-1927 file.
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ADDENDUM TO

NISQUALLY SUSPENSION BRIDGE

(Longmire Suspension Bridge) — Mount Rainier National Park Roads & Bridges

Spanning Nisqually River on Service Road

Longmire Vicinity

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